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'INFINITE USE OF FINITE MEANS': THE CREATIVE ASPECT OF THE LEXICON OF ENGLISH AS SEEN THROUGH SOME SAMPLES OF ENGINEERING JARGON

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'Linguistic creativity is 'the distinctly human ability to express new thoughts and to understand new expressions of thought within the framework of an instituted language' - Chomsky (1964)

'The birth of a new concept is invariably foreshadowed by a more or less strained or extended use of old linguistic material' - Sapir (1921)

ABSTRACT

This article is a simple study of the creative aspect of language, aptly described as 'the infinite use of finite means' by Wilhelm von Humboldt (Brown 1967: 82). More specifically it aims to demonstrate that the lexicon of the English Language (like any other language, for that matter) is self-generative. This is done by examining the formal and semantic relations between some samples of Engineering jargon, on the one hand, and the vocabulary of common ordinary usage including word formative lexical elements in the language, on the other, in order to show that the former is created from the latter ('more or less strained or extended use of old linguistic material' – (Sapir 1921: 17). The introduction explains the focus of the study in greater detail and also introduces certain notions and concepts used in the analyses that follow in the two major sections of the article. Section 1 examines the nature of the formal relations between the jargon and the lexical material from which it is created. Section 2 goes a step further to analyze the nature of the semantic relations underlying the formal relations described in Section 1. It is hoped that the analyses undertaken in both these sections will successfully show that the Engineering jargon is truly the result of the creative process operating within the lexicon of the language.

1.0 INTRODUCTION – FOCUS OF STUDY

New ideas or experiences are almost always based on existing ones. The new idea may either incorporate the whole of the existing idea or only part of it. And existing ideas are usually found encoded in the form of lexical items already existing in the language. It follows, therefore, that material from the current lexicon of the language becomes raw material for the creation of new words, a linguistic phenomenon most succinctly expressed by Wilhelm von Humboldt as 'infinite use of finite means' We can assume that in most cases some feature or features of the new idea or experience has already been encoded as either part of the meaning or as the total meaning of an existing item in the lexicon. And if the new idea can be represented by a single word, it is therefore logical to encode this idea using the existing lexical item whose meaning either partially or wholly is able to signal some significant aspect of the new idea.

For example, the word 'cradle' has existed in common usage since 1590 to refer to a place in which anything is nurtured in its early stage. Part of the meaning of 'cradle' obviously refers to the shape and form of the object. In 1874 this lexical form was first used in Engineering to refer to the ribbing for vaulting, ceiling etc., intended to be covered with plaster. The shape and form of this Engineering object was therefore already existing as a component of the meaning of the common word 'cradle'. So the meaning of the word 'cradle' included components that were able to represent certain aspects of this new engineering apparatus.

But naturally, once the word becomes an item in Engineering jargon, it takes on many additional components of meaning which denote other important features of the new engineering object. Also, those components of the original meaning which are irrelevant are discarded. We now have a new word. One or two components of its meaning are shared by both words but the rest belong to the new term.

The use of word-formative bound morphemes in the creation of new lexical items can also be explained in the same way. For example, the lexical item, 'photography' was first used in 1839. The word is made up of a word-formative bound morpheme ('photo'), an independent morpheme ('graph') and a grammatical bound-morpheme ('-y'). 'Photography' means 'the process or art of producing pictures by means of a chemical action of light on a sensitive film on the basis of paper, glass, metal, etc.' 'Light' is an essential component of this new phenomenon. So the existing word-formative element 'photo-' was used. In this instance the whole of the meaning of 'photo' became part of the meaning of the new word 'photography'.

In the light of the discussion above we may conceive of the semantic process underlying the creation of new lexical items as having either two or three dimensions. When only part of the meaning of the original word is transferred, we need to account for the following three dimensions.

1. **Transfer of components of meaning.** Only that part of the original meaning which describes important aspects of the new idea is retained. Quite often the entire meaning is transferred.
2. **Negation of components of the original meaning.** All irrelevant components belonging to the original meaning of the word are rejected.
3. **Inclusion of additional components of meaning.** The word now takes on additional components of meaning to signal all other aspects of the new idea or object.

When the whole of the meaning of the original word is absorbed, there are only two dimensions. 'Negation' does not apply.

2.0 SAMPLE STUDY – ENGINEERING JARGON

2.1 The Semantic Relation Between Some Samples of Engineering Jargon and Common Vocabulary Including Bound-Morphemes

Having discussed in general terms how new lexical items are created from existing one, let us now examine in greater detail one discipline in which many new words had to be formed to encode the growing mass of specialized knowledge, namely Engineering. The formal structure of the jargon of Engineering reflects certain regular patterns relating it to the vocabulary of common usage. These patterns may be identified and described in terms of the formal features of the jargon. In many cases the engineering words are identical to their counterparts in common vocabulary as we shall shortly see in the samples that follow.

There are also many others which have been created through various types of modification but still bear distinct resemblance to the original forms in common vocabulary. This section presents a broad classification of Engineering jargon derived from the common vocabulary. This classification which has ten categories will serve to show the formal relations that exists between the jargon and vocabulary of common usage and so support the notion of the creative principle that operates within the language.

Type One: In many instances the creation of new lexical items in the field of Engineering has involved the complete transfer of a lexical form already existing in common vocabulary with or without the original grammatical modifications. Some examples are given below.

1. **admittance** - A measure of how readily alternating current will flow in a circuit
2. **aspirator** – a device for drawing a stream of air or liquid through an apparatus by suction.
3. **burden** - The load in volt-amperes on the secondary of an instrument transformer.
4. **cradle** - The ribbing for vaulting ceiling etc. intended to be covered with plaster.

All such lexical forms are therefore commonly shared by the layman and the engineer. Though their meanings as used in Engineering are quite different from the meanings in common layman usage, there is always some semantic link between the two. The semantic connection is discussed in the next section.

Type Two: Many lexical forms in Engineering are created from the vocabulary of general usage but with some modifications which do not apply to their counterparts in common vocabulary. As such, these lexical forms, unlike the previous category, are formally distinct from the lexical forms in the common vocabulary from which they were created. Though the free morphemes and the grammatical morphemes (such as '-or' and '-ance') also exist in common usage, the particular combinations are peculiar to Engineering. Their forms are only partially shared by the layman and the Engineer. Examples of this type of lexical form follow.

1. **adder** (add + er) - A circuit in which two or more signals are combined to give an output signal amplitude that is proportional to the sum of the input signal amplitudes.
2. **alternator** (alternate + or) - An electric generator used in the production of alternating currents
3. **bottoming** (bottom + ing) - Large stones in a road laid on the formation.
4. **capacitance** (capacity + ance) Electrostatic capacity.

All the above lexical forms are derived from material available in the common vocabulary and the bound morphemes. But these particular combinations of the basic free morphemes and the suffixes do not occur in current English.

Type Three: Another type of lexical form in Engineering as in many other specialised fields involves a simple compounding of two or more independently existing lexical forms taken from the vocabulary of general usage. Many examples of lexical items created in this way are found in Engineering such as the following.

1. **afterbay** - The tail race of a water power plant at the outlet of the turbines.
2. **cold heading** - The process of forming the heads of bolts or rivets by upsetting the end of the bar without heating the material.
3. **contact breaker** - A device, usually electromagnetic, for repeatedly breaking and making an electric circuit, as in an electric bell.
4. **fishplate** - a pair of specially shaped plates used for joining the end of a rail to the next rail in the track.

A distinction needs to be made here between this category of lexical items and the next. The above Engineering terms have been created by compounding two lexical forms, both of which are taken directly from the common vocabulary. The next category also involves compounding two free morphemes but only one is from common vocabulary. The other, though originally from common usage, is a lexical item already existing in the jargon. In the following examples the latter is indicated in parenthesis.

1. **alligator clip** (clip) – a spring activated clip for temporary wire connections.
2. **bottlejack** (jack) - A screw jack in which the lowest part is shaped like a bottle.
3. **donkey pump** (pump) - Any of the several kinds of combined pump and steam engine. It may be operated independently of the engine.
4. **pile shoe** (shoe) – a high grade cast-iron on the foot of a wood or concrete driven pile to help it penetrate the soil.

Although the individual components of the above compounds feature very commonly in current English, they are not used in such combinations. On account of the peculiar combinations, they are easily recognised as Engineering terms rather than as items of common vocabulary.

Type Four: On other type of lexical form which accounts for a large number of Engineering jargon involves the blending together of word-formative bound morphemes such as 'trans', 'tele', 'micro', 'hydro', 'photo' with other independent lexical forms existing either in the common vocabulary or in the jargon itself.

1. **bistable** (bi + stable)
2. **electrometer** (electro + meter)
3. **ferrimagnetism** (ferri + magnetism)
4. **hydrodynamic** (hydro + dynamic)

Type Five: This type of lexical form in Engineering is created by conjoining two or more word-formative bound morphemes. This is a common word-forming method even within the vocabulary of current English itself. The word-formative bound morphemes used in the creation of the following words are very commonly used in Engineering.

1. **hydrolysis** (hydro + lysis)
2. **telephoty** (tele + photo + y)
3. **electrolyte** (electro + lyte)
4. **photolysis** (photo + lysis)

The individual morphemes have their own independent meanings. For example, 'electro-' has to do with 'electricity', 'hydro-' to 'water' and 'tele-' to 'distance'. In the same way the suffixes have specific meanings such as '-lysis' which means 'decomposition or dissociation'. Such word-formative bound morphemes with fairly simple meanings are combined to embody complex scientific ideas.

1. **hydronics** (hydro + electronics)
2. **bionics** (bio + electronics)
3. **microtron** (micro + electron)
4. **neuristor** (neuro + resistor)

In the last example even the bound morpheme 'neuro-' has been subjected to modification.

Type Seven: Another class of lexical items is created by blending two independent lexical forms. This type differs from Type Three in that some formal modification takes place on either one or both of the original forms. More commonly the modification applies to only one of the original lexical forms that are blended together. In such cases either the terminal part of the initial morphemes or the initial part of the terminal morpheme is modified. The latter is less common than the former. Sometimes the vowel 'o' or 'i' is used to link the two together. Some examples are:

1. **acoubuoy** (acoustic + buoy)- An acoustic listening device used on land to form an electric fence that will pick up sounds of energy movements and transmit them to orbiting aircraft or land stations.
2. **altimeter** (altitude + meter) - An instrument used in air navigation to indicate altitude above sea level or above ground level.
3. **colourimeter** (colour + meter) - An instrument that measures colour by determining the intensities of the three primary colours which will give that particular colour.
4. **declinometer** (decline + meter) - An instrument for measuring the variation of the magnetic needle

Type Eight: Lexical items such as the above form a significant proportion of Engineering jargon. Another less common group of lexical blends which is similar to the previous class involves the removal of the terminal part of the initial morpheme as well as the initial part of the terminal morpheme. The examples below illustrate this word forming method.

1. **ampacity** (ampere + capacity)
2. **lubritection** (lubrication + protection)
3. **positron** (positive + electron)
4. **silistor** (silicon + resistor)

Type Nine: Another more restricted class of new lexical items is created by using common nouns, particularly, the names of certain individuals who have discovered a new scientific principle for instance. This is done in order to honour the person involved. The following are examples taken from Engineering.

	Name of Unit	Discoverer	Unit of
1	joule	Joule	energy
2	watt	Watt	power
3	volt	Volt	potential difference
4	roetgen	Roetgen	radiation dosage

One might want to think that there is no semantic link between the newly created lexical items and the names of the individuals. But if the meaning of a proper noun like 'Curie' for instance can be regarded as representing the person herself or himself, one of the significant components of the meaning is 'the specific work done and contributions made to humanity by the individual'. This would then establish the semantic link. The examples given above not only function as independent lexical items but have combined with certain bound morphemes to create other lexical items such as:

1. **faradism** (farad + ism)
2. **microfarad** (micro + farad)
3. **macrohertz** (macro + hertz)
4. **coulometer** (coulomb + meter)

Type Ten: Acronyms form another small group of lexical forms in Engineering. They are usually formed by linking together all the initial letters of a group of the words that name the Engineering idea or object. In this way a single-word name (acronym) is created for the idea or object for the sake of greater practicality.

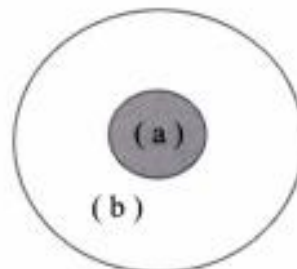
1. **laser** - Light Amplification by Stimulated Emission of Radiation
2. **maser** - Microwave Amplification by Stimulated Emission of Radiation
3. **radar** - Radio Detection and Ranging
4. **lava** - Linear Amplification for Various Applications

2.2. The Semantic Relations Between Some Samples of Engineering Jargon and Common Vocabulary Including Bound-Morphemes

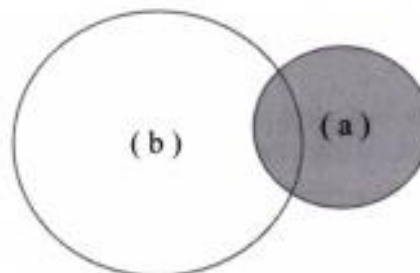
The previous section examined the relations between the forms of some examples of Engineering jargon, certain lexical items in current English and some bound morphemes in order to demonstrate that the jargon is created from material already existing within the language. In this section we shall look at the semantic connections underlying the formal relations that were illustrated in the earlier section. The actual nature of the semantic relations will help to account for the formal relations and also enables us to understand how the creative principle operates.

To help us identify the nature of the semantic link we shall be relying on Nida (1975:15–20) who described four types of semantic links that exist between lexical items that are derived from others. However, only two of his four types are relevant for our purpose: 'inclusion' and 'overlapping'. The rest of this section, which examines the semantic relations between some of the Engineering jargon discussed in the earlier section, will demonstrate that the connection is basically either the 'inclusion' or 'overlapping' type. In some cases it involves a combination of both.

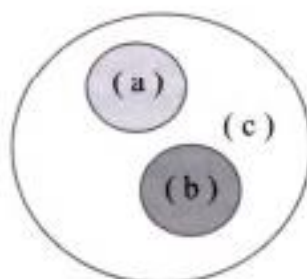
1. **Inclusion** – When the meaning of a lexical item includes the whole of the semantic value of another, the relation between the newly created word and its source is said to be one of inclusion.



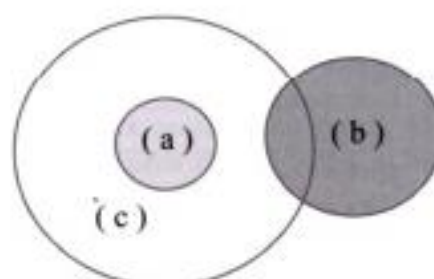
2. **Overlapping** – Overlapping is the term used to describe the semantic link when only part of the meaning of a lexical item is included within the total meaning of the new word.



When an Engineering lexical item has been created from two words from common vocabulary or one word and a word-formative bound morpheme, the new Engineering word may include both their meanings or include one and overlap with another as the following two diagrams depict.



inclusion - inclusion



inclusion - overlapping

Example 1

a	agitate (common usage)	To move or force into violent irregular action;
b	agitator (Engineering)	Mechanical apparatus for mixing and/or aerating device; for creating turbulence,
The whole of the meaning of (a) describes the manner in which the engineering apparatus operates. The meaning of (b), however, consists of many other components such as those relating to the object's shape, size, structure, function etc.		
Semantic Relation: Inclusion		

Example 2

a	capacity (common usage)	The power of receiving or containing
b	capacitor (Engineering)	An electric condenser; a device for accumulating and holding a charge of electricity.
The power to hold is one of main features of this engineering device and from the vocabulary of common usage a word that carries that meaning become core material in the creation of this new engineering word with a modification using the bound morpheme 'or'. The whole of the meaning of (a) is therefore become part of the meaning of (b)		
Semantic Relation: Inclusion		

Example 3

a	ram (common usage)	A male sheep
b	ram (Engineering)	The weight of a pile-driving machine
c	ram (Engineering)	The piston of a large cylinder of a hydrostatic press
A characteristic habit of a ram (a) is that it batters persistently with a great deal of force to produce a desired effect. This feature also characterises the Engineering object, ram (b) and ram (c). So only this component of the total meaning of ram (a) is shared by the engineering words.		
Semantic Relation: Overlapping		

Example 4

a	apron (common usage)	An article of dress, originally of linen, worn in front of the body to protect the clothes from dirt or injury, or simply as a covering.
b	apron (Engineering)	a. A hard surface to the sea bed or to the bed of banks of a stream or canal to prevent scouring.
Both objects are used to perform a protective function. The meaning of apron (a) consists of a component 'to prevent damage' and so does the meaning of apron (b). This component is shared by the two words and forms only part of the meaning of either.		
Semantic Relation: Overlapping		

Example 5

a	pound (common usage)	A unit of weight divided into 16 ounces
b	poundal (Engineering)	The force which acts on one pound of matter for one second generating a velocity of one foot per second
The whole of the meaning of pound is included within the total meaning of poundal.		
Semantic Relation: Inclusion		

Example 6

a	reluctance (common usage)	Unwillingness
b	reluctance (Engineering)	The resistance of a magnetic circuit to magnetic flux
As can be seen clearly, the meaning of reluctance (b) is a core component of the meaning of 'reluctivity'. It follows also that the meaning of (a) is part of the meaning 'reluctivity'.		
Semantic Relation: Inclusion		

Example 7

a	escape (common usage)	Unwillingness
b	escapement (Engineering)	The resistance of a magnetic circuit to magnetic flux
The meaning of 'escapement' quite clearly shows that the whole of the meaning of 'escape' is included within its total meaning.		
Semantic Relation: Inclusion		

We have had a look at some single-word lexical items. Lets examine the semantic nature of lexical compounds in the jargon.

Example 8

a	diving (common usage)	To submerge, as a submarine or skin diver
b	bell (common usage)	A hollow metallic object, generally cup-shaped, which gives forth a clear, musical ringing sound on being struck.
c	diving bell (Engineering)	A bell-shaped steel chamber raised and lowered to the sea bed or river bottom by a powerful crane, in which persons may descend into deep water.
The meaning of 'diving bell' includes the total meaning of 'diving' (a) and the component of the meaning of 'bell' (b) relating to the shape of the object. The creation of this engineering lexical item therefore involves both processes of 'inclusion' and 'overlapping'. Semantic relation: Inclusion-Overlapping		

Example 9

a	weep (common usage)	To manifest grief or other strong passion by shedding tears
b	hole (common usage)	A hollow place in a solid body or mass
c	weephole (Engineering)	A hole to allow water to escape from behind a retaining wall and thus reduce the pressure behind it.
When a person weep a form of liquid is discharged. A weephole allows liquid to escape. As such only part of the meaning of (a) is included within the total meaning of (c) which also takes on the whole of the meaning of (b) Semantic relation: Overlapping-Inclusion		

Example 10

a	photo (word-formative bound morpheme)	Pertaining to light
b	emission (common usage)	The act of throwing or giving out, as light, heat, steam; to send out
c	photoemission (Engineering)	The phenomenon of emission of electrons from a surface, due to the absorption of radiation such as light.
The whole of each of the meaning of 'photo' and 'emission' forms important components of the total meaning of 'photoemission'. Semantic Relation: Inclusion-Inclusion		

3.0 CONCLUSION

The samples of Engineering jargon discussed above are created from lexical material already existing in the language as independent morphemes or word-formative bound morphemes. It is hoped that the evidence provided above in the preceding two sections is sufficient to support this conclusion. If it is, we should be able to safely generalize that the lexicon of the language is creative – that it constantly allows for the creation of new lexical material from existing ones ('infinite use of finite means').

The reader may have also noticed one fundamental principle that underlies the extension of existing primary lexical forms to create new lexical items. The more abstract and general the meaning of the original material, the higher the potential for the transfer of reuse of the form in the creation of new lexical items. Bound morphemes such as 'semi-', 'hyper-', 'sub-' and 'trans-' have very high mobility in this respect. On the other hand, independent morphemes whose meanings are more specific or concrete have limited potential. The nature of the semantic content of existing words therefore plays a vital role in determining the frequency with which its form may be extended for reuse in the creation of new lexical items.

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